Multi-Task 120
SafeTrak

Operators' Manual

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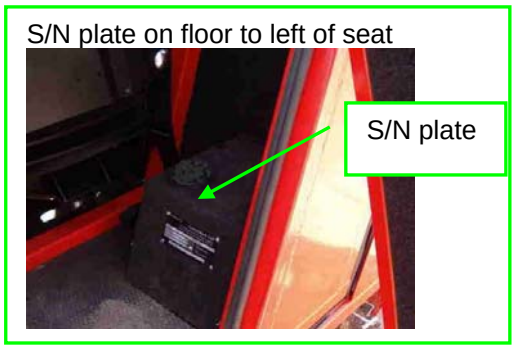
INTRODUCTION

This manual explains the proper operation of your machine. Read these instructions thoroughly before operating and maintaining the machine. Failure to do so could result in personal injury or equipment damage. Consult your GreenMech supplier if you do not understand the instructions in this manual.

CAUTION! This symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury to yourself or others, and carefully read the message that follows.

We recommend that you keep this manual with the machine in the box, if provided. Note here the serial number and quote it in any communications. This is important when ordering spares. Remember to include all numbers and letters.



Serial Number.....

VIN number……

Write in the numbers!

This manual covers the GreenMech **Multi-Task 120 Safetrak** tool carrier fitted with **Seppi Mulching Head model……, new crane model……and flail model……**

CAUTION! Always refer to individual Instruction Manuals supplied with the engine and tools.

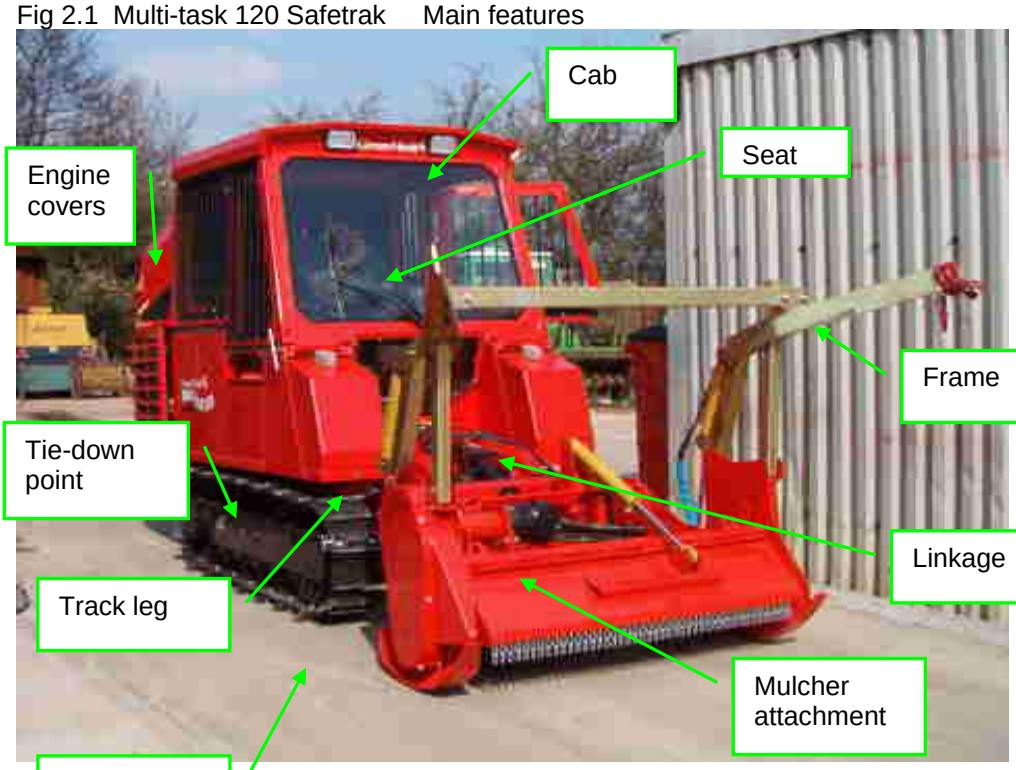
If in doubt, always quote the serial number in any communications.

The information in this manual is correct at the time of publication. However, in the course of development, changes to the machine specification are inevitable. Should you find any information to vary from the machine in your possession please contact your GreenMech dealer for up to date information.
The manual may contain standard and optional features and is not to be used as a machine specification.

PURPOSE

CAUTION! This machine is designed solely as a tool carrier for use in vegetation control and forestry operations and must only be fitted with GreenMech approved attachments The machine should only be used by trained operators who are familiar with the contents of this instruction manual. It is potentially hazardous to fit or use any parts other than genuine GreenMech parts. This machine is for Off Highways use only. GreenMech Ltd disclaims all liability for the consequences of such use, which in addition voids the machine warranty.

Fig 2.1 Multi-task 120 Safetrak Main features



TECHNICAL SPECIFICATION Multi-Task 120	
Hydraulic drive Output	157 litres/min at 350 bar
Auxiliary hydraulic	2 double acting services 10 litres/min at 230 bar
	1 double acting services 25 litres/min at 230 bar
Power unit	90KW @ 2200rpm water cooled Deutz diesel
Fuel capacity	140Lt
Hydraulic capacity	190Lt
Length (without tool)	3600mm
Length (with Seppi Mulcher)	4500mm
Width over body	1500mm
Track width	1590mm-2490mm
Track size	250mm x 2145mm
Height	2340mm - 2700mm
Weight	4880Kg
Ground pressure	0.6kg/cm^2

Noise
Noise levels vary depending on the tool fitted and the type of material being processed. Also duration of operation is variable.
Noise emission tests have been carried out:
At the operator's seat with cab window closed the A weighted sound pressure level is **84dB(A).** Ear protection is recommended.
Outside the machine the guaranteed sound power level is **109dB(A)**

Minimise noise by switching to idle or stopping the engine whenever work is not in progress.

CAUTION! The operator is recommended to wear appropriate ear protection. Other Site workers and bystanders are recommended to wear ear protection and visors and must keep at least 20m away from proximity of machine.

Lifting Points
There are no lifting points.

Tie - Down Points
Secure using only the four tie-down rings on the track units (fig 2.1).
CAUTION! Do not use for lifting.

3.1 ENSURE:

3.1.1 All Operators must be fully trained in the use of their machine.
(Certificated Operator training courses are available on request.)
3.1.2 The Operators Manual is read and understood.
3.1.3 The Operators Manual for the attachment is read and understood
3.1.4 Appropriate HSE guidance notes are read and understood.
3.1.5 This tool carrier is for Off Highways use only.
3.1.6 All guards are fitted and in good condition.
3.1.7 Tool blades are in good condition and secure.
3.1.8 All blades are maintained according to tool suppliers instructions.
3.1.9 All fasteners are checked regularly for tightness.
3.1.10 Correct First Aid Kit including large wound dressing is available on site.
3.1.11 Fire extinguisher is available on site.

3.2 NEVER:

3.2.1 Work on the machine until the engine has stopped.
3.2.2 Operate the machine without protective clothing, or high visibility clothing when working on roadside.
3.2.3 Operate with loose articles of clothing, including loose cuffs on gloves.
3.2.4 Work under a raised component without adequate safety support.
3.2.5 Operate the machine with untrained personnel or with individuals present who are not involved in the operations.
3.2.6 Leave the machine unattended with engine running at full operating speed. (See section 4)
3.2.7 Put any part of your body near the tool while the machine is running.
3.2.8 Operate the machine whilst under the influence of alcohol or drugs.
3.2.9 Stand between the tracks and the machine body.
3.2.10 Stand within 2 metres of the tracks when the legs are being extended.
3.2.11 Extend legs in a dangerous manner.
3.2.12 Stop the engine or operate the tool when moving directly up or down a slope.
3.2.13 Operate inside a building or confined space.
3.2.14 Climb on the tool.
3.2.15 Leave the seat with the rotor running.
3.2.16 Start with the cutter raised.
3.2.17 Work over loose rocks.
3.2.18 Work towards buildings.
3.2.19 Smoke whilst refuelling.
3.2.20 Fell trees without guard frame.
3.2.21 Check for leaks with bare hands.

3.3 ALWAYS:

3.3.1 Check machine before starting (see Section 4 Preparation and Section 5.1 Operation: Pre-work checks).
3.3.2 Be aware of potential hazards in the work area, i.e. uneven ground, tree roots, obstructions and type of materials being fed into the machine.
3.2.3 Approach work area slowly.
3.3.4 Have a second trained operator within easy reach of the machine.
3.3.5 Maintain strict discipline at all times.
3.3.6 Service machine at specified periods. (see Section 6: Routine Maintenance).
3.3.7 Note direction of debris discharge and wind direction to prevent debris from being blown into highway or where it could affect members of the public.
3.3.8 Adjust legs to keep the body as level as possible.
3.3.9 Check the route to the worksite for gradients, undulations and obstructions.
3.3.10 Remove key before doing any maintenance.
3.3.11 Check any unusual noise and vibration.

3.4 Safety Controls and Switches

3.4.1 In the event of an emergency, push the emergency stop button located in front of cab roof to right of operator (Fig 3.4.1). This will lock in position. Wait for the rotor to stop. Note: The engine will continue to run with all output disengaged. It can be stopped with the key switch (see 3.6) but cannot be restarted without resetting the emergency button.

3.4.2 A battery isolator button is located in the fuse cabinet on the left hand side (Fig 3.4.2). This isolates all electrics except the alternator circuit.

⚠ CAUTION! See also section 4 Preparation: 4.4 Seat – 4.4.1 Safety

Fig 3.4.1 STOP Switch in cab roof

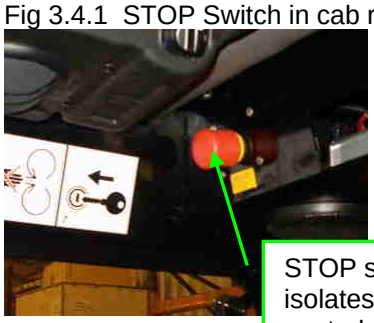
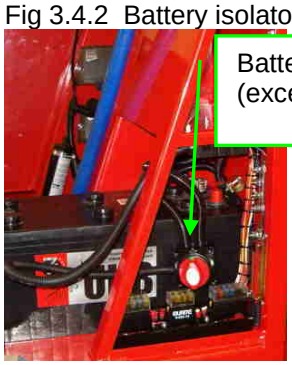


Fig 3.4.2 Battery isolator



3.4.3 Rotor direction is indicated on the lights above the front window. According to direction, either of the rotor switches (Fig 3.4.3) will stop the rotor.

3.4.4 Maintain the machine body and tilting seat to keep the seat in as level position as possible.

A fuller explanation of the controls is given in Section 5 - Operation

Fig 3.4.3 Left Hand Controls

Fig 3.4.4 Joystick Buttons

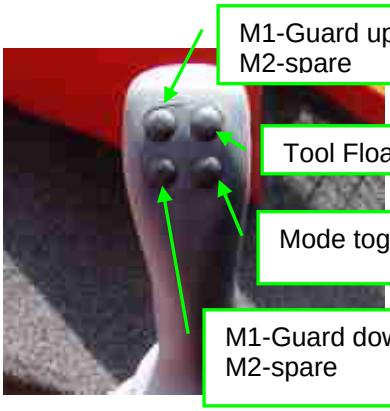


Fig 3.4.5 Left Hand Joystick Movements - Mulcher head control

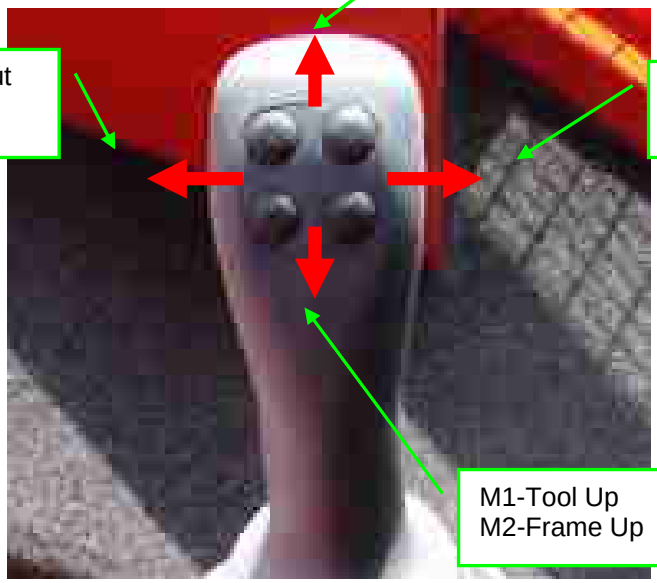
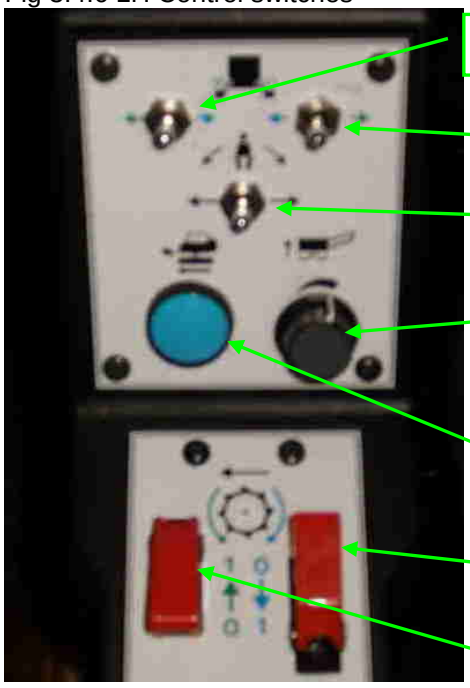


Fig 3.4.6 LH Control switches



A fuller explanation of the controls is given in Section 5 - Operation

3.5 Tracking Levers (Fig 3.5.1 and Fig 3.5.2)

3.5.1 Lever controls operate the drives to the tracks. Push for forward motion. Pull for reverse motion.

⚠ CAUTION! Machine can pitch forward and backwards when controls are operated. Use firm control movements and familiarize before attempting rough terrain.

Fig 3.5.1 RH Track controls

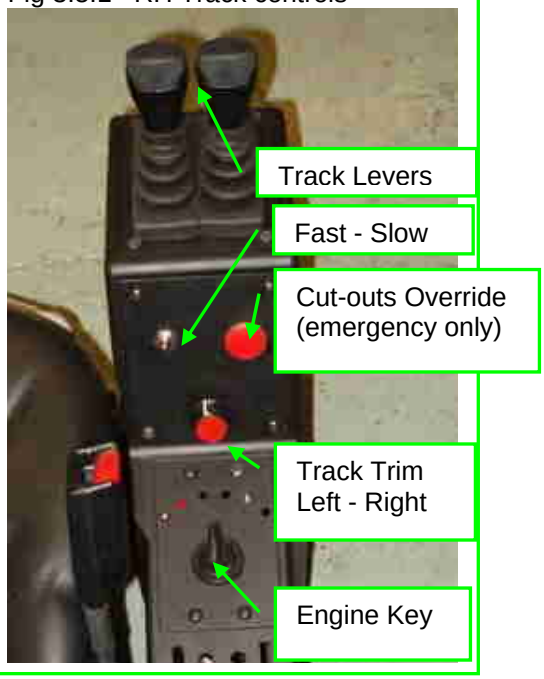
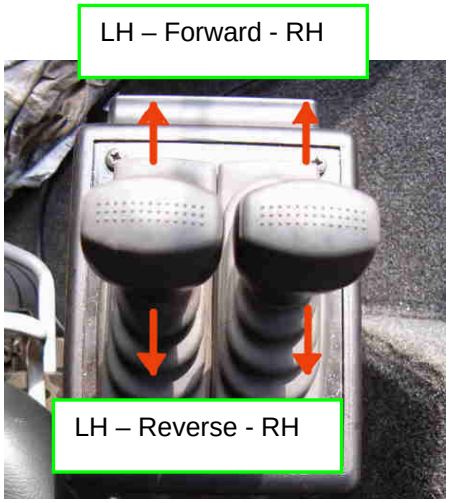


Fig 3.5.2 Track levers

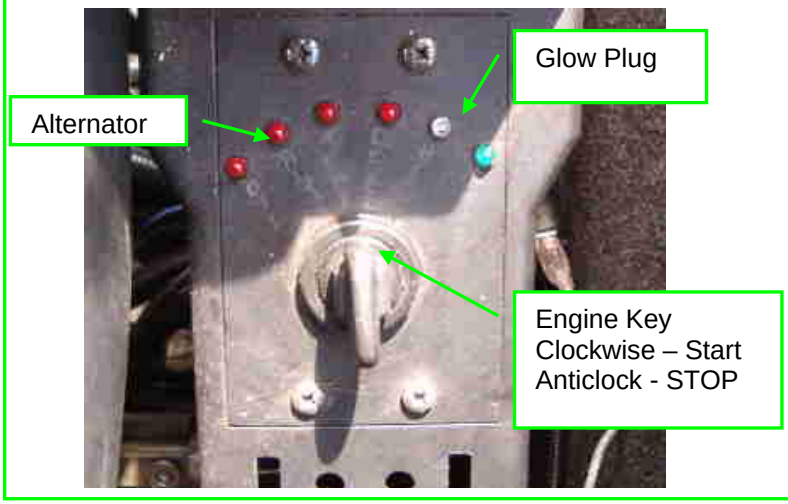


3.6 Engine stop switch

3.6.1 To stop the engine, turn the start key anticlockwise (fig 3.6).

⚠ CAUTION! Do not restart engine until hazard has been removed.

Fig 3.6.1 Engine Key



3.7 Control cut-outs

Cut-outs are installed to stop and prevent restarting due to specific events.
3.7.1 Engine coolant level too low.
3.7.2 Engine oil pressure too low.
3.7.3 Operator not present in seat.
3.7.4 Left hand armrest control pod not in work position.
3.7.5 Override button (Fig 3.5.1) immobilizes engine cut-outs for emergency use only.

A fuller explanation of the controls is given in Section 5 - Operation

3.8 SYMBOLS on the MACHINE

These relate to operator safety, correct use and maintenance of machine. Check that all personnel understand and are familiar with meanings before using the machine.

Important Safety symbols

Take the correct action shown on the display below the stated hazard (see table)

General Safety decal in cab - explanation follows from left to right

Caution! / Remove key / Do NOT start engine
Caution! - Read instruction manual
Beware flying object hazard - Wear helmet & visor
Beware noise hazard - Wear ear protectors
Beware trapping hazard - Wear suitable clothes
Keep machine level-incorrect – Keep machine level-correct
Beware flying object hazard - Keep bystanders away
Beware exposed drives hazard - Fit all guards
Caution! - Keep nuts tight
Caution! - Max safe side slope 35deg
Caution! - Max safe up and down slope 25deg
Electricity! – Keep away from power lines
Caution! – Fasten seat belt

Additional Safety Decals located on machine

Caution! Beware crushing hazard

Action: Do NOT stand in area between machine body and tracks

Caution! Beware crushing hazard

Action: Prop cab when raised

Caution! Beware moving components

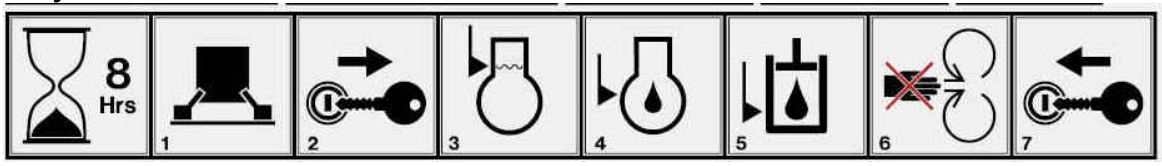
Action: replace guards after maintenance

Caution! Beware hot surface

Action: Keep away - until cool

Important Operating Checks Notice
Before use carry out daily the stated checks in the order shown (see table)

Daily Checks



Every 8 Hours –Daily checks
1. Check machine is level
2 Stop engine
3. Check coolant level
4. Check engine oil level
5. Check hydraulic oil level
6. Check all guards are in place
7. Start engine

Other Information

Noise level

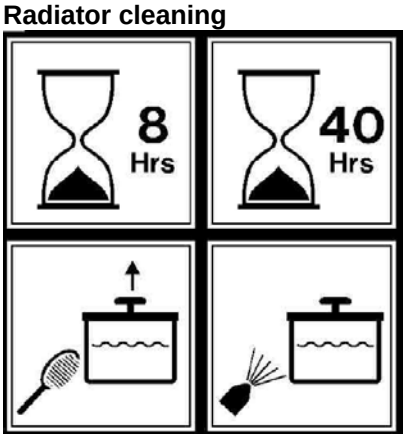
Ear defenders must be worn outside cab

Noise level in Cab

Ear defenders recommended

Maintenance Information

Radiator cleaning



8 Hours	40 Hours
Check radiator screen	Blow out radiator core

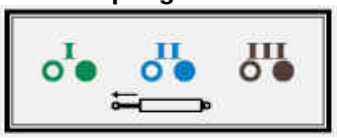
Grease point

40 hours / weekly

Hydraulic Filler

Implement Hydraulic connections

Ram couplings

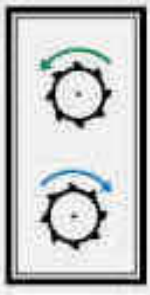


Note: Always use correct locations

Motor Couplings

Note: Always use correct locations

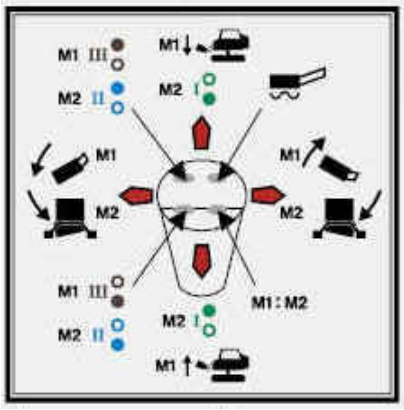
Rotor Direction



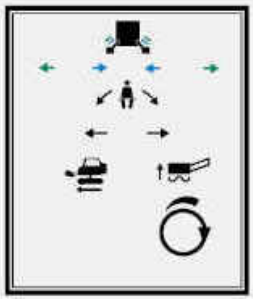
Operating Information

Control Decals Implement operation on left hand Tracking motion on right hand

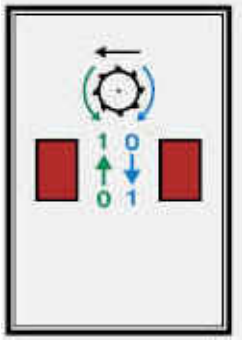
Left hand Joystick decal



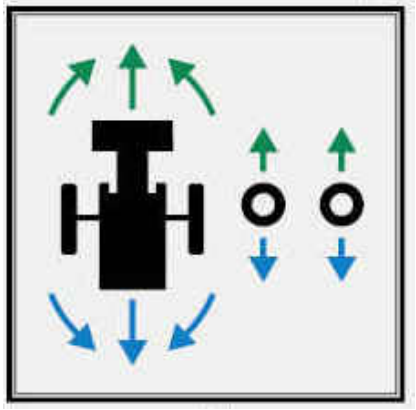
Left hand upper switch decal



Left hand lower switch decal



Right hand Joysticks Decal



Right hand upper switch decal

Cut-outs Override (emergency only)

Fig 4.2.1 Tool hitch plate prepared

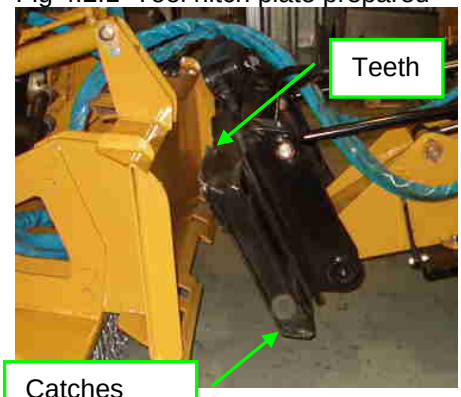
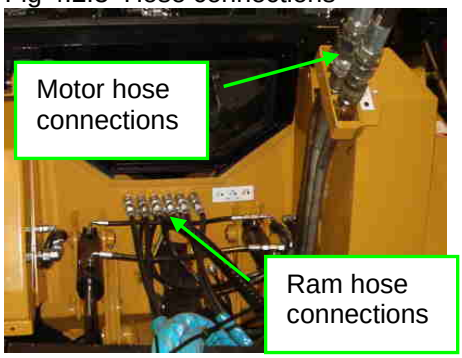


Fig 4.2.2 Tool hitch plate engaged

Fig 4.2.3 Hose connections



Ram hose connection pairs for Mulcher - viewed as shown:

Frame : Spare : Front guard
Use II (spare) for catch hoses

4.1 Initial Fuelling and Parking

4.1.1 Ensure the machine is level.
4.1.2 Fill the fuel tank with diesel. See section 6.
4.1.3 Top up the hydraulic tank if necessary, with the correct oil. See Section 6.
4.1.4 Clean faces of hose connections.

4.2 Tool Mounting

(See 4.6 for boom flail attachment)

4.2.1 Connect catch hoses at connections II. (fig 4.2.3)
4.2.2 Use LH joystick buttons Mode 2 (fig 3.4.4) to raise hydraulic catches.
4.2.3 Drive the machine carefully up to the tool.
4.2.4 Hook mounting plate teeth under lip on tool plate.
4.2.5 Lower catches to engage catches into slots on tool plate.
4.2.6 Remove and park catch hoses.
4.2.7 Fit the motor (if not fitted) and connect all hydraulic hoses (fig 4.2.3).
4.2.8 Operate the linkage controls to check functions and lift the tool.
4.2.9 Check hoses remain clear of any pinch points.
4.2.10 Check all guarding is in place.
4.2.11 Operate rotor control at Slow speed to check operation.

⚠ CAUTION! Ensure all guards are fitted correctly before use.

⚠ CAUTION! Before travelling, always check the tool is free from debris.

4.3 Tool removal

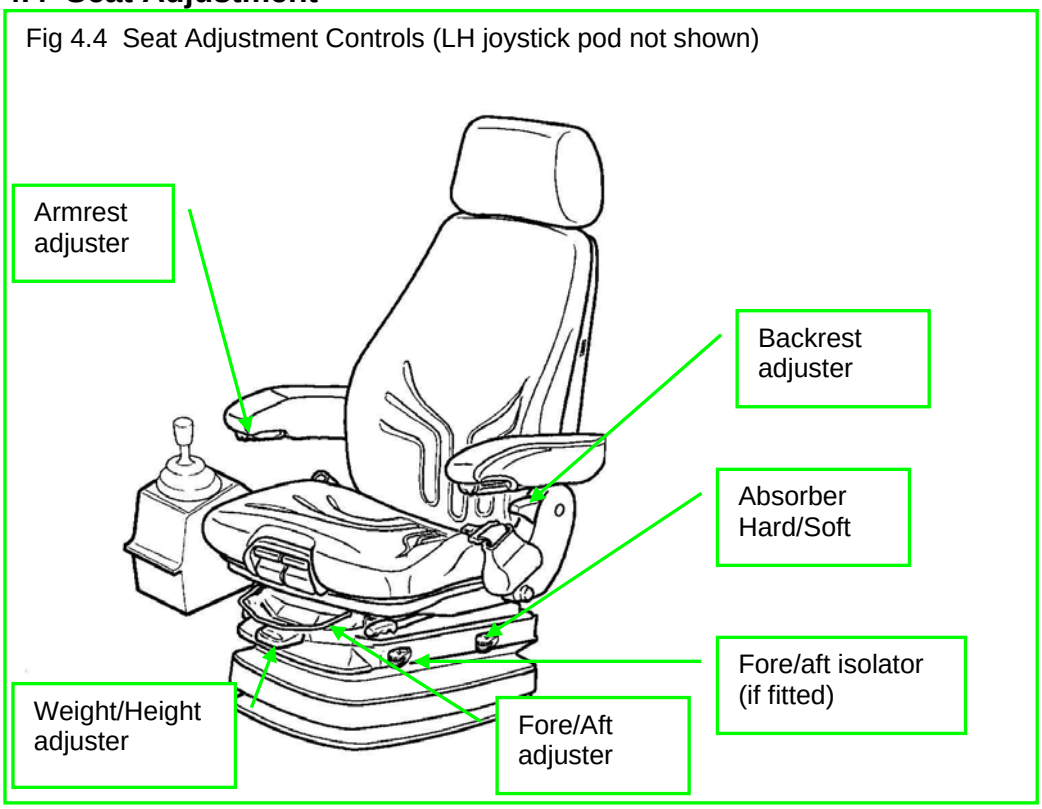
4.3.1 Lower tool onto level ground.
4.3.2 Connect catch hoses.
4.3.3 Carefully disengage catches.
4.3.4 Adjust linkage to release tool.

⚠ CAUTION! The weight of the tool may cause it to unhook suddenly and pitch forward or back.

4.3.5 Disconnect all hoses and park tidily on tool.

4.4 Seat Adjustment

Fig 4.4 Seat Adjustment Controls (LH joystick pod not shown)



4.4.1 Seat Safety

⚠ CAUTION! To prevent back damage, adjust to driver's weight before use and before every change of driver. See 4.4.2.1 below

⚠ CAUTION! Ensure no objects are within moving area of driver.

⚠ CAUTION! Check settings before use.

⚠ CAUTION! Do not adjust any settings while driving.

⚠ CAUTION! Use the seatbelt. Replace and check all mountings after an accident.

⚠ CAUTION! Do not place a load on the seat. Unexpected activation of presence control may occur.

⚠ CAUTION! Do not adjust backrest with upholstery removed.

⚠ CAUTION! Do not attempt maintenance without specialist information from manufacturer.

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4.4.2 Seat Adjustments (Fig4.4)

4.4.2.1 Set weight with the machine and operator absolutely still, briefly pull weight/height actuator. The shock absorber must be set to 'Soft' (4.4.2.6).
4.4.2.2 Set height by pressing weight/height actuator fully out or in. Do not operate for more than 1 minute. The shock absorber must be set to 'Soft' (4.4.2.6).
4.4.2.3 Adjust backrest using locking lever. Ensure it is locked when set.
4.4.2.4 Set fore/aft position by lifting cross bar. Ensure it is locked when set.
4.4.2.5 Set armrest height using rollers under armrests.
4.4.2.6 Set absorber to suit terrain. Position 1 - soft Position 2 - hard
4.4.2.7 Set fore/aft isolator to suit conditions. position 1 - Off Position 2 - On

4.5 Cab - additional features

The cab is also fitted with external work lights (front and rear), windscreen wiper, air conditioner with cabin light, radio, 12V output socket, and engine diagnostic button (for dealer use only)

Fig 4.5.1 Cab Roof

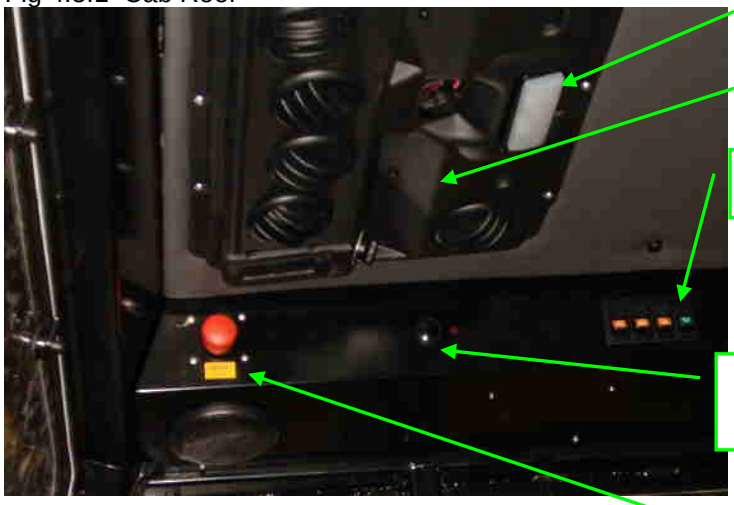


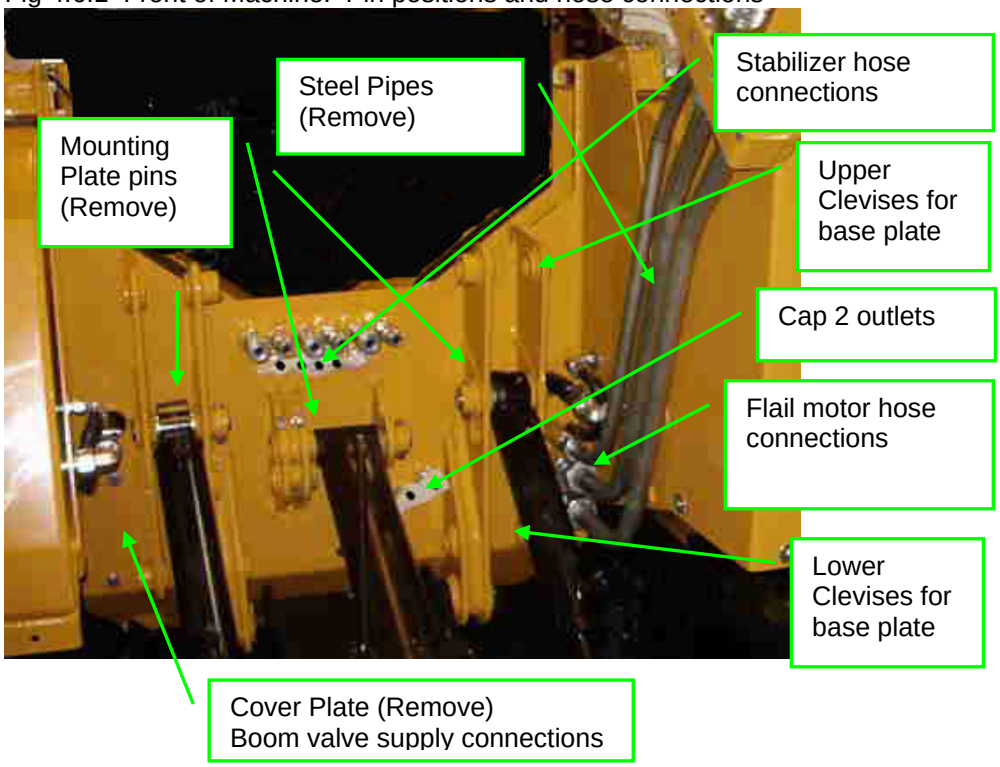
Fig 4.5.2 Cab Front view

4.6 Flail Head on Crane Attachment

Note: To fit this attachment, the Multi-Task mounting plate is removed and the crane is fitted in two parts, base plate and boom (with or without flail fitted).
Note: LH and RH always refer to the machine as viewed from the operator's seat.

⚠ CAUTION! The use of an overhead crane is essential.

Fig 4.6.1 Front of Machine. Pin positions and hose connections



4.6.1 Removal of mounting plate (Fig. 4.6.1).

4.6.1.1 Rest the plate on the ground and support with a crane.
4.6.1.2 Disconnect all hydraulic pipes where attached to machine mainframe
4.6.1.4 Remove steel pipes to motor connections

⚠ CAUTION! Take care to minimise spillage of oil.

4.6.1.5 Remove all pins supporting the mounting plate and hydraulic cylinders and carefully swing the plate away from the base machine.

4.6.2 Fitting the base plate (Fig. 4.6.1).

4.6.2.1 Remove the cover plate over RH hose outlets.
4.6.2.2 Cap the lower pair of hose outlets.
4.6.2.3 Using a crane, swing the base plate into position, leaving sufficient space to fit the hoses.
4.6.2.4 Fit the hoses for the crane boom valve and stabilizer legs to the outlets as shown.
4.6.2.5 Fit the pins as shown to secure the base plate. Note: It may be necessary to release the upper arm bolts in order to line the pins up.
4.6.2.6 Tighten all fasteners and remove the crane.

Fig 4.6.3.1 Boom to base plate bolts

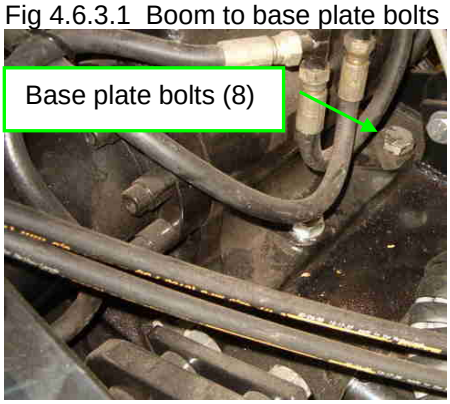


Fig 4.6.3.2 Front guard & stabilizers

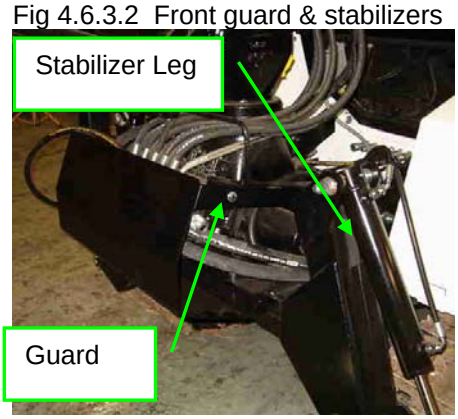


Fig 4.6.4.1 Boom joystick mountings

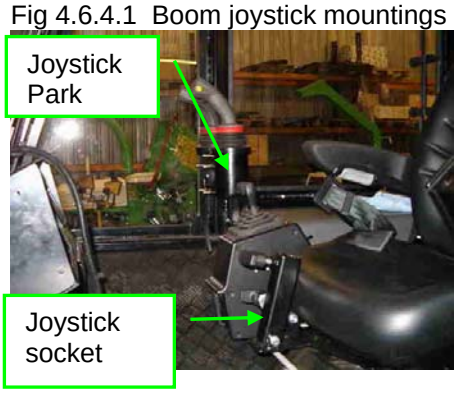
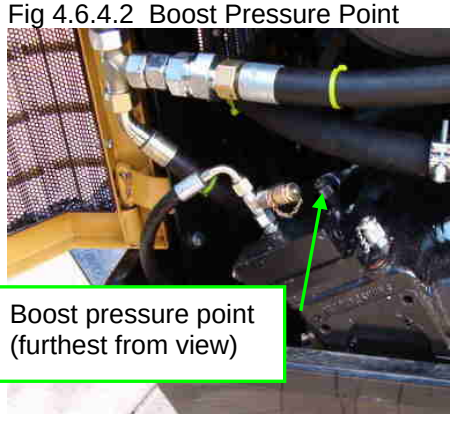


Fig 4.6.4.2 Boost Pressure Point



4.6.3 Fitting the boom with flail

4.6.3.1 Using a crane, swing the boom into position onto the base plate.
4.6.3.2 Secure with 8 bolts as shown (Fig 4.6.3.1).
4.6.3.3 Connect the feed hoses to the boom valve (if not fitted).
4.6.3.4 Fit the front guard (Fig 4.6.3.2).
4.6.3.5 Tighten all fasteners and remove the overhead crane.
Note: Temporary removal of the boom only may be carried out as required.

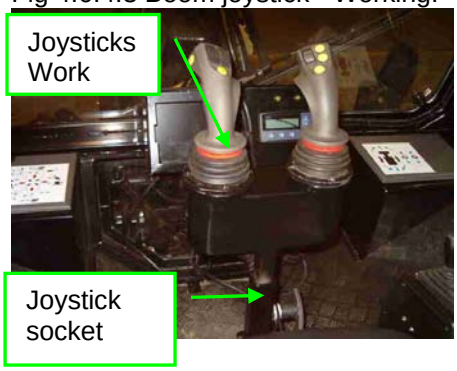
4.6.4 Fitting the controls

In use the twin joystick bracket is located on the centre of the seat, between the legs of the operator. It has a park socket to the right of the cab to enable the operator to enter and leave the seat.
4.6.4.1 Place the twin joystick assembly in the park socket (Fig 4.6.4.1).
4.6.4.2 Connect all electric cables.

⚠ CAUTION! Read the tool Instructions before operating for the first time

4.6.4.3 Check that the closed loop pump boost pressure stabilizes at 25 bar by cranking the engine without starting. See fig (4.6.4.2) for pressure point behind engine. If low, top up hydraulic oil (See **Section 6.5**)
4.6.4.4 Test all operations as **4.6.5** below.
4.6.4.5 Sit in the seat and place the joystick assembly into the central work position (Fig 4.6.4.3).
4.6.4.6 Practice operating controls.

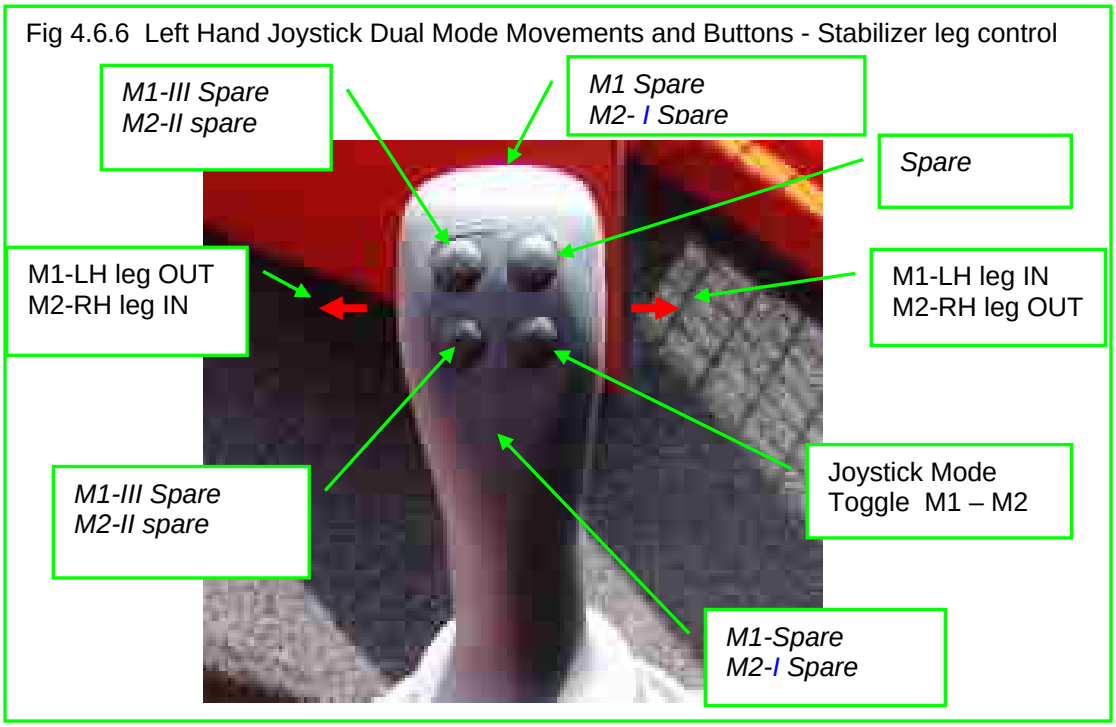
Fig 4.6.4.3 Boom joystick - Working.



4.6.5 Operating functions.

Multi-Task Left Hand joystick is used for stabilizer legs only (Fig 4.6.6)

Fig 4.6.6 Left Hand Joystick Dual Mode Movements and Buttons - Stabilizer leg control



Multi-Task LH switches are used for flail rotor controls as marked in Fig 5.3.3 **Section 5** Boom joysticks. See Boom and Flail head Instruction Manuals for joystick operations

⚠ CAUTION! Read the tool Instructions before operating for the first time

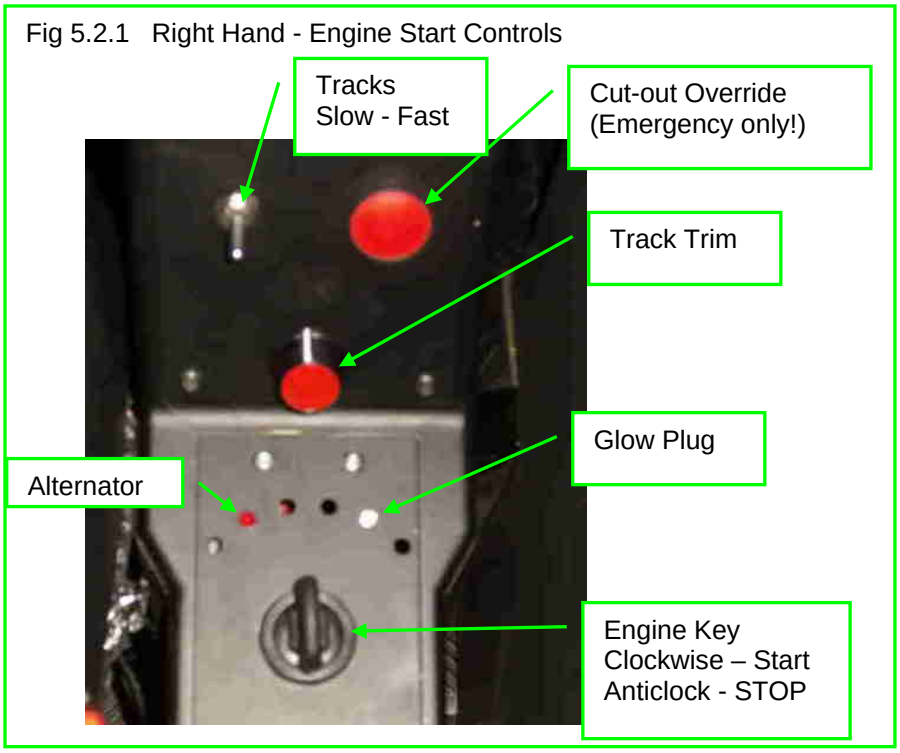
5.1 Pre-Work Checks:

5.1.1 Check work area for foreign bodies, loose rocks, metal etc.

⚠ CAUTION! Sparks from the tool can cause fire.

5.1.2 Check no unauthorised people present.
5.1.3 Check other site workers are aware of machine and at a safe distance.
5.1.4 Check seat settings (see 4.4)
5.1.5 Check remote service hoses are correctly fitted. I = Frame, II = spare, III = Guard.

Fig 5.2.1 Right Hand - Engine Start Controls



5.2 Starting Machine:

5.2.1 Put speed control toggle switch into SLOW position (fig 5.2.1)
5.2.2 Check all other personnel are clear of machine.
5.2.3 Check that rotor is switched OFF (Fig 5.3.1)
5.2.4 Turn start key to PRE-HEAT position.
5.2.5 After 5 seconds, turn key to START position to start engine.

Fig 5.3.1 Right Hand - Track levers

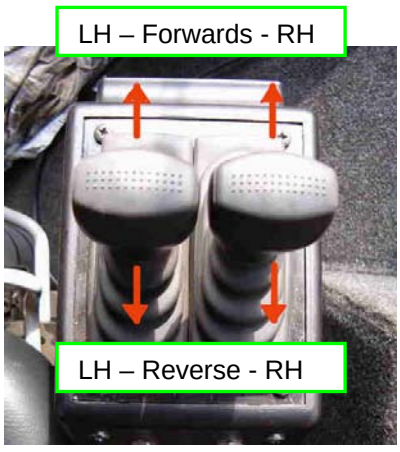
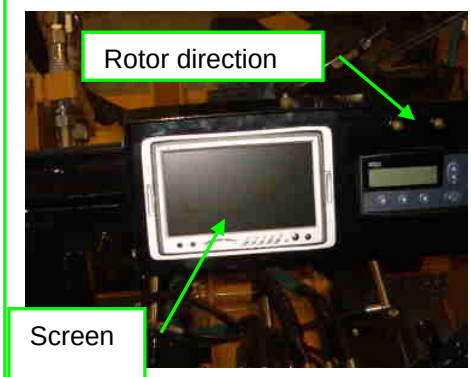


Fig 5.3.2 Reversing - CCTV Screen



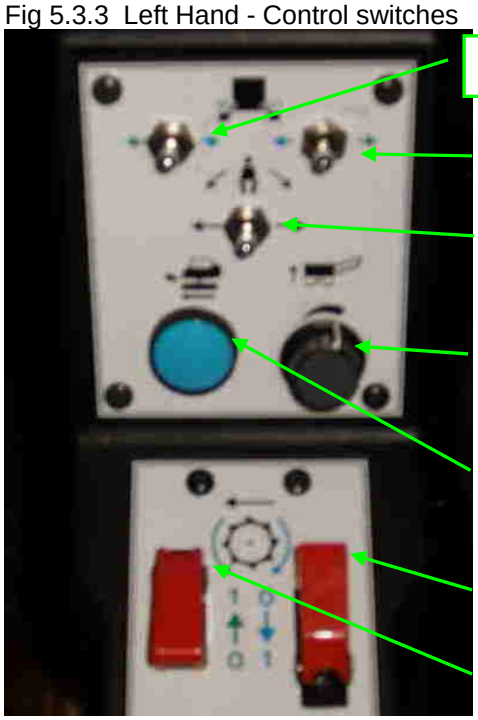
5.3 Moving the Machine

⚠ CAUTION! Before moving machine, check for obstructions directly behind.

5.3.1 Check that the tool is lifted clear of the ground.
5.3.2 Push both levers forwards together to start forward movement (Fig 5.3.1).
5.3.3 Check and use the CCTV screen for reversing (Fig 5.3.2).
5.3.4 Extend legs as required, keeping body level. (fig 5.3.3)
5.3.5 Switch speed SLOW to FAST to increase speed (Fig 5.2.1).
5.3.6 Push left or right lever to steer. See also 5.3.9.
5.3.7 At work site adjust legs to level the body as much as possible.
5.3.8 Level Seat as much as possible (Fig 5.3.1).
5.3.9 Set Track Trim knob to bias steering to left or right as required (Fig 5.2.1).

Note: When extending or retracting legs it is advisable to track the machine.

Fig 5.3.3 Left Hand - Control switches



⚠ CAUTION! When extending legs, do not force track against solid objects. This may dislodge track.

⚠ CAUTION! Avoid static turns on hard surfaces. This will rapidly wear the tracks

⚠ CAUTION! Do not drive directly up slopes exceeding 25 degrees. Slopes up to 35 degrees may be traversed with care.

5.4 Autodrive controls

5.4.1 The 'cruise control' toggle (Fig 5.3.3) may be used to lock a set speed.
5.4.2 The machine may then be steered using the track trim bias knob (Fig 5.2.1)
5.4.3 The track trim bias may be used to maintain direction across a slope.

Note. The set speed is reduced to a stop when the mulching tool becomes overloaded.

⚠ CAUTION! Reset track trim bias to straight position prior to driving on roadways.

The following Instructions 5.5 – 5.13 apply to use of the Mulching tool

5.5 Starting the Tool

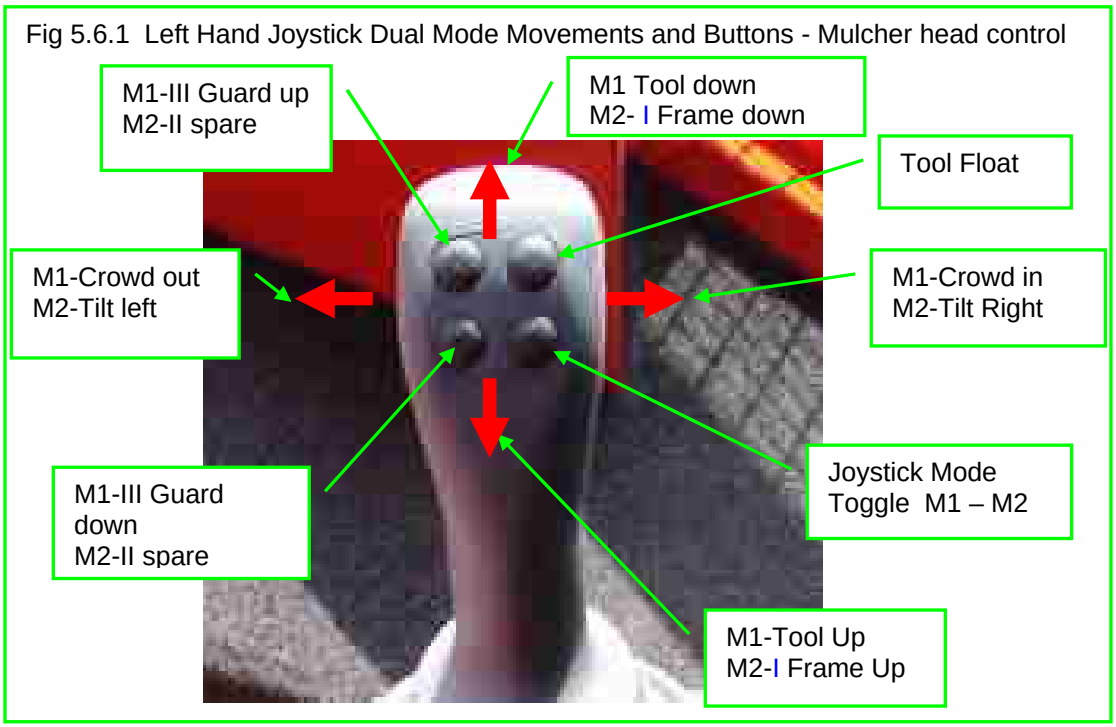
CAUTION! Read the tool Instructions before operating for the first time

5.5.1 Switch rotor to FORWARD to start the rotor (Fig 5.2.1).
5.5.2 Note rotor direction is correct for work (Fig 5.3.2).
5.5.3 Switch from SLOW to FAST Increase speed (Fig 5.2.1).
5.5.4 Approach the work slowly.

5.6 Front Guard adjustment (Fig 5.6.1). Remote Service III

5.6.1 Toggle joystick mode button to select Mode 1 - guard movement obtained on LH joystick buttons.
5.6.2 Use Left Hand buttons to set front guard.

Fig 5.6.1 Left Hand Joystick Dual Mode Movements and Buttons - Mulcher head control



5.7 Tilt adjustment

5.7.1 Toggle joystick mode button once to Mode 2 (Fig 5.6.1)
5.7.2 Push joystick to left or right to adjust tool tilt.

5.8 Tool Float

5.8.1 Press tool float button once to allow tool to float
5.8.2 Press again to restore lift control or pull joystick to operate lift
5.8.3 Adjust float pressure with rotary knob (Fig 5.3.3)

5.9 Frame adjustment Remote Service I

5.9.1 Toggle joystick mode button to Mode 2 to switch joystick movement from tool lift to frame lift.
5.9.2 Pull or push joystick to adjust frame.

5.10 Tool Crowd adjustment

5.10.1 Toggle joystick mode button to Mode 1 to switch joystick movement from tool tilt to tool plate tilt fore and aft.

5.10.2 Move joystick to left or right to adjust crowd.

5.11 Stopping the Tool

5.11.1 Press Forward switch down to stop the motor.

5.11.2 Wait for tool to stop.

CAUTION! The rotor will take several minutes to stop due to its inertia.

5.12 Reversing the rotor.

5.12.1 Stop the rotor with Forward switch to OFF.

5.12.2 Wait for rotor to stop.

5.12.3 Switch Reverse switch from OFF to Reverse

5.12.4 Check guard positions and close if necessary.

5.13 Operating Hints

5.13.1 Always set the pitch of the tool and guard settings to suit the type of work.

5.13.2 Do not approach too fast.

5.13.3 Use in float mode where possible to allow head to align with ground.

5.13.4 Close front guard and lift tool before turning.

5.13.5 Select SLOW to reduce speeds to idle when not working.

5.13.6 Use **Autodrive** controls (Section 5.4) when possible to save operator fatigue

CAUTION! Always read the Instruction Manual(s) supplied with the tool.

CAUTION! Keep working area around the machine clear at all times and check only authorised personnel are present and in safe position.

5.14 On Completion Of Work

5.14.1 Check that engine has stopped and rotor is stationary.

5.14.2 Remove surplus material from rotor and machine surfaces.

5.14.3 Lower tool

5.14.4 Park machine and lock cab.

CAUTION! Do not leave machine parked directly up or down slope.

Note: Remote Service II is spare and used only to operate hydraulic catches for implement plate when hoses are fitted. See Section 4.2

ROUTINE MAINTENANCE SCHEDULE

⚠ CAUTION! Always remove key and check for rotation before carrying out any maintenance.

⚠ CAUTION! Always refer to individual Instruction Manuals supplied.

Action	Section	Page
DAILY		
Check engine oil level and coolant (ref: engine manual)	6.3 – 6.4	6-5
Check hydraulic oil level	6.5	6-5
Check fuel level	6.6	6-5
Check fuel water separator	6.6	6-5
Check condition of all tool retaining bolts	Refer to tool manual	
Clean radiator screen and around radiator	6.7	6-6
Check condition of tracks	Refer to track manual	
Check track gear, nuts, rollers and bearings	Refer to track manual	
FIRST 50 HOURS		
Check battery levels	6.11	6-7
Check hydraulic connections	6.13	6-7
Check all mountings	6.14	6-7
Check air cleaner	6.9	6-6
Replace hydraulic return filter elements	6.15	6-8
Service engine	Refer to engine manual	
WEEKLY in addition to Daily actions		
Grease all pivots and slide pads	6.1, 6.12	6-3, 6-7
Blow out radiator core with air line	6.7	6-6
Steam clean machine	6.8	6-6
Clean air cleaner	6.9	6-6
Check electrical connections	6.10	6-6
Check battery levels	6.11	6-7
Check hydraulic connections	6.13	6-7
Check all mountings	6.14	6-7
250 hours in addition to Daily and Weekly actions		
Check condition of bearings and pivots	6.1, 6.12	6-3, 6-7
Check all fluid levels	6.3, 6.4, 6.6	6-6
Service engine	Refer to engine manual	
Check track gear units, rollers and bearings	Refer to track manual	
Replace return filter elements	6.15	6-8
500 hours in addition to Daily and Weekly actions		
Replace pressure filter	6.16	6-8
Replace fuel filters	6.18	6-8
1000 hours in addition to 250 hour actions		
Change hydraulic oil when replacing filter element	6.17	6-8

DIESEL ENGINE MAINTENANCE	**REFER TO ENGINE MANUAL**
TRACK MAINTENANCE	**REFER TO TRACK MANUAL**
TOOL MAINTENANCE	**REFER TO TOOL MANUAL**
CONTROL SYSTEM	**REFER TO DEALER**
SEAT MAINTENANCE	**REFER TO DEALER**
AIR CONDITIONER MAINTENANCE	**REFER TO DEALER for Annual Service**

Recommended lubricants	**Specification**
Hydraulic Oil*	EQUIUIS ZS46 (ISO6743/4 DIN 51524 HVLP)
Grease	Complex grease EP2 (high temperature)
Engine	SAE 10W-40 ACEA A3/B3

***Use only GreenMech approved oil in the hydraulic system.**

6.1 Lubrication Points (see also 6.13)

Fig 6.1.1 Lubrication points summary

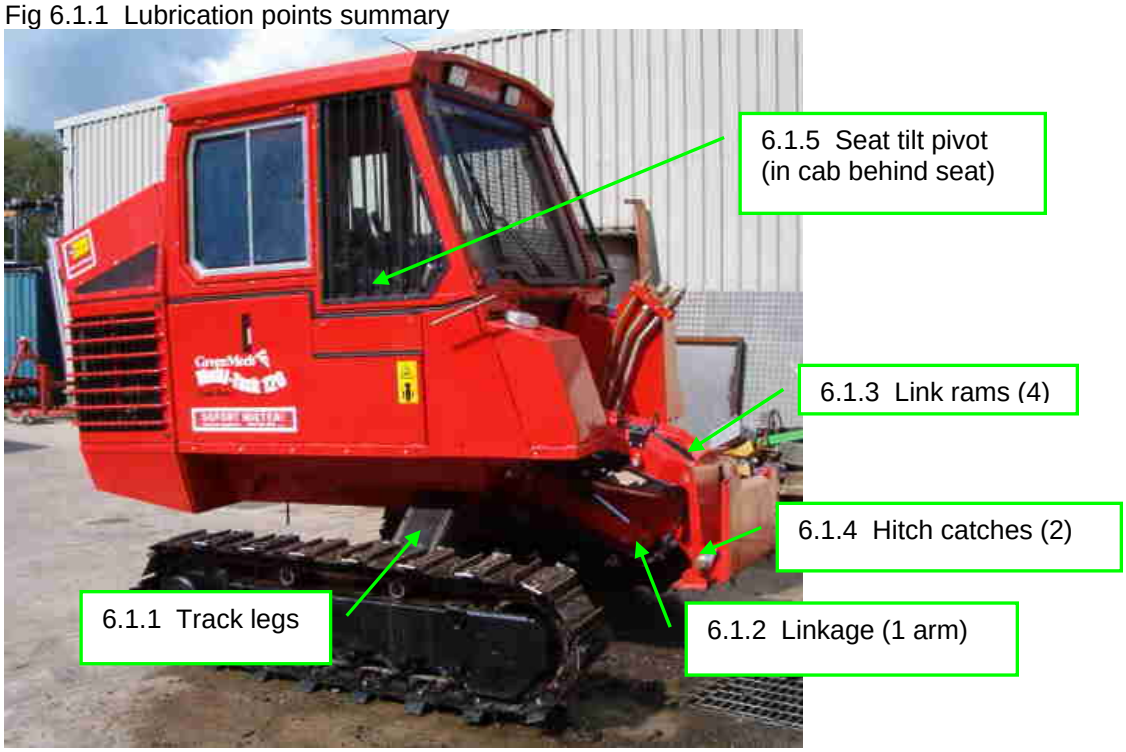
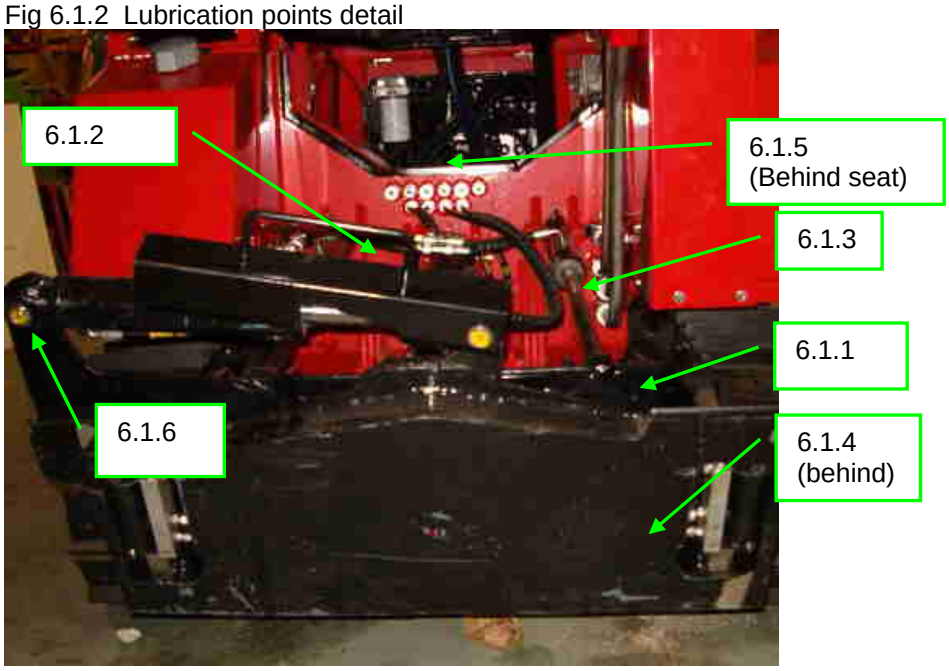


Fig 6.1.2 Lubrication points detail



Grease except where stated

6.1.1	Track legs each side	Clean and smear with grease. Operate full stroke to spread grease.
6.1.2	Link arm	Nipple each end of arm
6.1.3	Link rams (two)	Nipple each end of ram
6.1.4	Hitch plate catches	Nipple behind hitch plate
6.1.5	Seat pivot	Nipple behind seat
6.1.6	Tilt ram	Nipple behind hitch plate
6.1.7		

Fig. 6.2.1 Cab lift pump

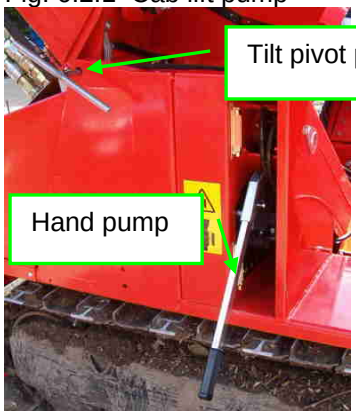
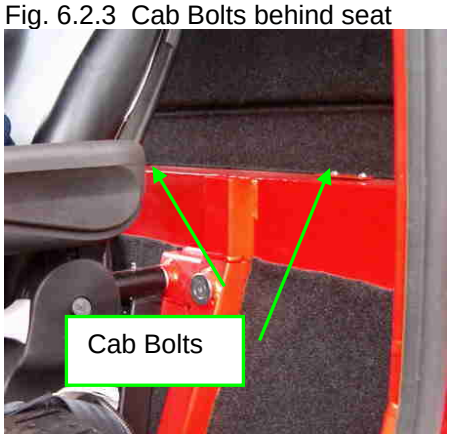


Fig. 6.2.2 Cab Front Mounting Bolts under covers

Fig. 6.2.3 Cab Bolts behind seat



6.2 Raising Cab

The following components are accessed for maintenance by tilting the cab forwards on its mountings. Battery, Hydraulic return filter, Control valve…

6.2.1 Check that the tool is lowered to ground.

6.2.2 Remove any loose equipment from cab.

6.2.3 Fit cab pivot pins to front tilt hinges. Pins are stored in hand pump enclosure. (fig.6.2.1)

6.2 4 Remove mounting bolt covers from four corners. (fig 6.2.2 & 6.2.3)

6.2.5 Remove 8 M12 mounting bolts.

6.2.6 Place handle into hand pump on left of machine.

6.2.7 Pump until cab is fully raised.

6.2.8 Locate prop to secure (Fig 6.2.4).

6.2.9 To lower, turn knob to gently release pressure. Check cables and hoses.

6.2.10 Refit bolts and tighten to secure cab in operating position.

6.2.11 Replace covers.

6.2.12 Remove pivot pins and stow with hand pump.

⚠ CAUTION! Ensure raised cab is mechanically propped before carrying out maintenance.

⚠ CAUTION! Check hoses and cables are not trapped as cab is lowered.

Fig. 6.2.4 Cab mechanical prop

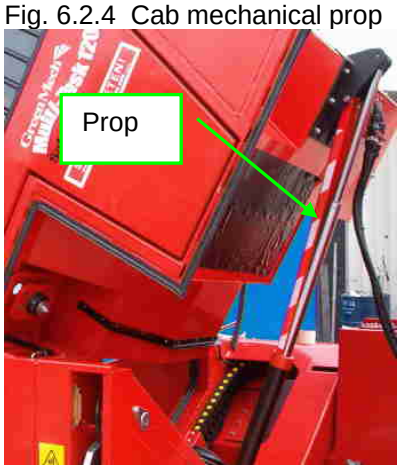


Fig. 6.3 Engine dipstick

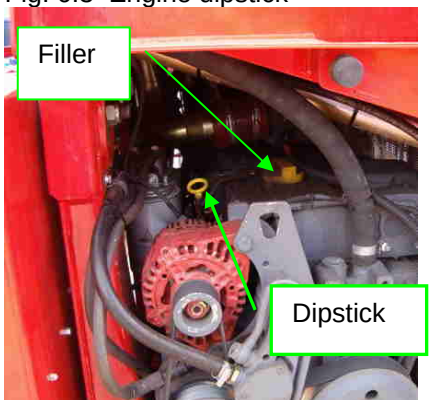


Fig.6.4 Coolant filler

Fig 6.5 Hydraulic Filler and level

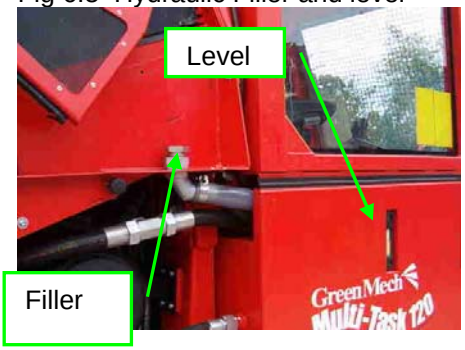
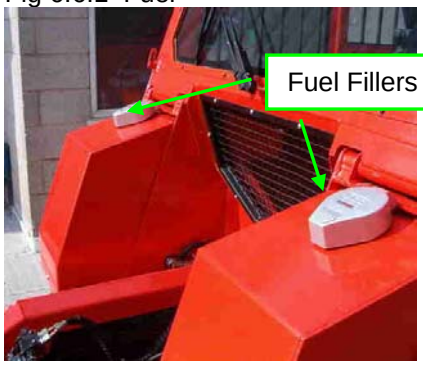


Fig 6.6.1 Fuel



6.3 Engine Oil

Check daily

6.3.1 Release locks and swing back left hand engine cover to reveal dipstick and filler (fig 6.2).
Refer to engine manual to refill.

6.4 Coolant

Check daily

6.4.1 Refill as required (fig 6.4).

⚠ CAUTION! Do not remove cap when engine is hot.

Note: Before winter check antifreeze.

6.5 Hydraulic Oil

Check daily at level indicator on right hand side. Correct level is half way up indicator.

6.5.1 To refill unlock and lift rear cooler cover to access filler (Fig 6.5).

6.5.2 If below mark, check for leaks and refill to correct level.

1000 hours

6.5.3 Remove drain plug, Drain tank and refill with clean oil of correct specification.

6.5.4 Replace filter.

6.6 Fuel

6.6.1 Check daily before work and fill with diesel as required. (Fig 6.6.1)

6.6.2 Check water separator (RH engine cover) and drain if required. (Fig 6.6.2)

⚠ CAUTION! Use clean diesel fuel only. If in doubt, use a funnel with a filter.

⚠ CAUTION! Do not use any form of synthetic fuel.

Fig 6.6.2 Fuel water separator

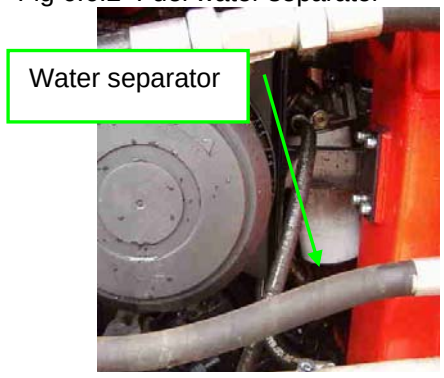
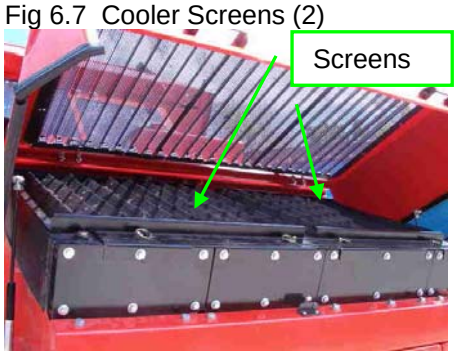


Fig 6.7 Cooler Screens (2)



Daily

6.7.1 Unlock and raise rear cooler cover.

6.7.2 Remove clips and lift out each radiator screen, clean and replace (fig 6.7).

50 hours

6.7.3 In addition to above, remove rear engine cover and blow out radiator core from below with suitable airline and clear from above.

⚠ CAUTION! A build up of debris risks overheating of the engine and a risk of fire.

6.8 Steam Cleaning

50 hours

6.8.1 Check all covers are fitted and closed.

6.8.2 Steam clean machine surfaces.

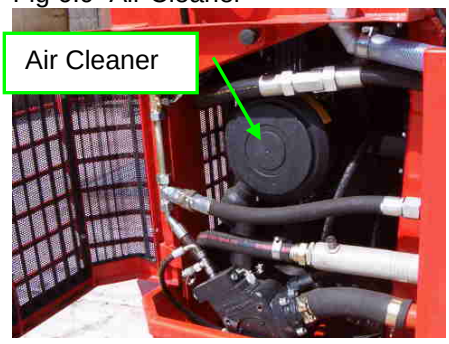
6.8.3 Clean exposed electrical components with a damp rag, spray with WD40 and then wipe with dry rag.

⚠ CAUTION! Do not steam clean directly on to electrical components, e.g. control boxes.

6.9 Air Cleaner

50 hours

Fig 6.9 Air Cleaner



6.9.1 Unlock and hinge back right hand engine cover to access.

6.9.2 Release clips and remove aircleaner cover (fig 6.10).

6.9.3 Release wingnut, slide out element and either blow out with air-line or gently tap on smooth ground to release debris. If badly contaminated replace element.

6.9.4 Replace and tighten wingnut finger-tight.

6.9.5 Replace cover and close engine cover.

6.10 Electrical connections

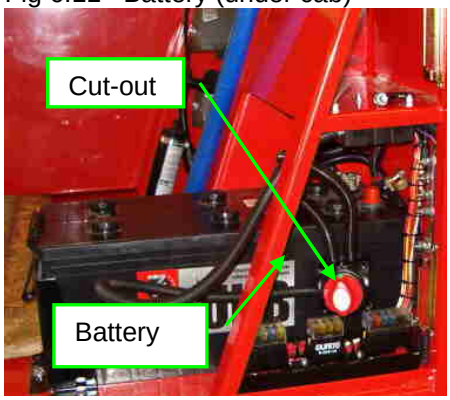
50 Hours

6.10.1 Check all wiring loom connections are secure.

⚠ CAUTION! Poor connections will affect engine security cut-outs and may prevent starting.

6.7 Coolers (Radiator)

Fig 6.11 Battery (under cab)



6.11 Battery (under cab)
50 hours
6.11.1 Raise cab (see 6.2)
6.11.2 Check electrolyte level and top up if required (fig 6.12.1)

⚠ CAUTION! Gases are explosive. Electrolyte is corrosive. Avoid sparks and spillage.

6.11.3 Removal of battery
6.11.3.1 First disconnect negative (-) cable.
6.11.3.2 Disconnect positive (+) cable.
6.11.3.3 Remove clamps and carefully lift out battery.
6.11.3.4 Replace by connecting positive cable before negative.

6.12 Bearings and Pivots
50 hours
See section 6.1 for routine lubrication.
250 hours
Note. refer to tool instruction manual.
6.12.1 Check rotating components for excessive movement and noise in operation.
6.12.2 Replace as required.

6.13 Hydraulic connections
50 hours then 250 hours
6.13.1 With the aid of the circuit diagram to follow the hose routings, check all hoses and connections for leaks and damage.
6.13.2 Replace any worn or damaged hoses with the correct type and length.
6.13.3 Before removal, check routing and ensure replacement hose is fitted free of strains, twists or kinks.

⚠ CAUTION! Ensure any residual pressure is released before dismantling.

⚠ CAUTION! Ensure hoses are refitted free of twists and kinks.

6.14 Mountings
50 hours then 250 hours
6.14.1 Check that all mounting bolts are tight.

Fig 6.15. Hydraulic Return filters

Fig 6.16. Hydraulic pressure filter

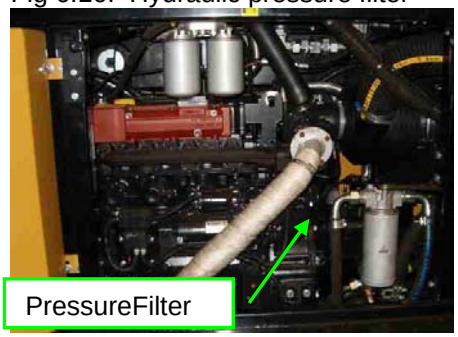
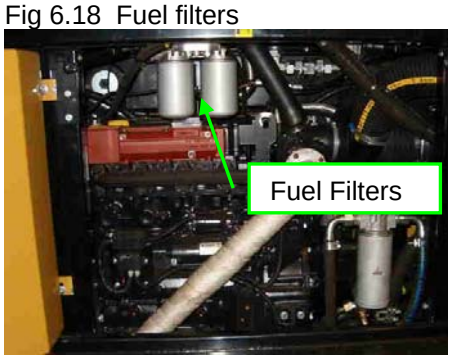


Fig 6.18 Fuel filters



6.15 Hydraulic Return Filters (Cab raise) (Fig 6.18.)
First 50 and then 250 hours
6.15.1 Raise cab (see 6.2)
6.15.2 Check oil is cool.
6.15.3 Unscrew the filter cover (there is a spring under the cover) and carefully lift out the element. It may require gentle prising out, discard safely).
6.15.4 Fit a new filter element to the correct specification and replace the cover and spring.

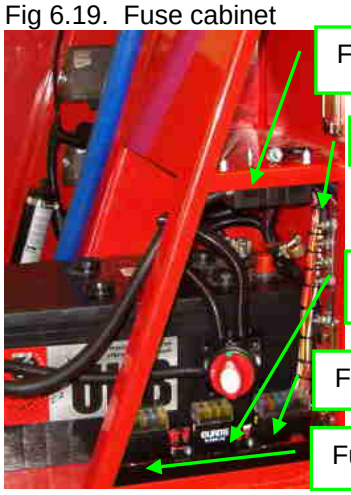
⚠ CAUTION! Do not overtighten.

6.16 Hydraulic pressure filter (Fig 6.16)
500 hours
6.16.1 Unlock and lift out rear engine cover.
6.16.2 Unscrew pressure filter and replace.

6.17 Hydraulic Oil change
1000 hours
6.17.1 Remove hydraulic oil with suction pump at filler, or via drain plug on underside of tank and replace with new oil of correct specification.
6.17.2 Replace suction filter.
6.17.3 Dispose of waste oil according to local authority environmental procedures.

6.18 Fuel Filters
500 hours
Fuel pre-filter with water separator is accessed from RH engine cover (fig 6.6.2). Main twin fuel filters are accessed from rear engine cover (fig 6.18).
6.18.1 Remove all spin on cartridges and replace with correct specification.

Fig 6.19. Fuse cabinet



6.19 Fuses

Fuses are accessed behind door on left hand side (behind cab), except for engine preheat on back of engine.

Fuse table

Fuse function	Location	Value	Colour
Engine preheat	Back of engine	125A	
Master to busbar	Top of cabinet	200A	
Alternator charge	Side of cabinet	200A	
Ignition/start switch	Base of cabinet	20A	N (Thick)
Seat ram	Base of cabinet	30A	RW (Thick)
Front lights	Base of cabinet	25A	RY (Thick)
Rear lights	Base of cabinet	15A	RU (Thick)
Wipers + Modem	Base of cabinet	20A	RB
Power Socket + Radio	Bas of cabinet	15A	NR
MDM display / LH Joystick	Base of cabinet	5A	RY
Power XT2A0 electronics (part)	Base of cabinet	20A	RO
Power XP2A1 electronics (part)	Base of cabinet	20A	RW
Power XP2A0 electronics (part)	Base of cabinet	20A	R
Power ECU Via Main Relay	Base of cabinet	25A	R (Thick)
Heater Matrix Via eater Rely	Base of cabinet	30A	W (Thick)
Coolant Level Switch	Base of cabinet	5A	GU
A/C Compressor Via A/C Relay	Base of cabinet	7.5A	UG
Spare/Crane	Base of cabinet	40A	NY
Air Filter + ECU Via Emergency Stop Rely for ECU	Base of Cabinet	7.5A	OW

6.20 Fault finding

Fault	Check	Action	Page
Engine will not start	Emergency stop	Check and release	3-2
	Operator presence	Check seated correctly	3-5
	Left hand control pod	Check in work position	3-5
	Battery isolator	Check switched ON	3-2
	Battery	Recharge	6-7
	Fuel	Fill tank	6-5
	Oil pressure	Check Oil level	6-5
	Coolant level	Fill coolant	6-5
	Fuses	Check	6-9
	Track legs	Set to correct position	5-1
Machine unsteady	Tool rotor and bearings	Check and replace	6-7
Unusual noise(s)	Hydraulics	Check operation	6-13
Track legs do not extend	Hydraulics	Check operation	6-13
Tracks do not drive			

7.1 Storage

7.1.1 Remove tool
7.1.2 Thoroughly clean machine and note any replacement parts required.
7.1.3 Carry out 250 hour service if not already done. Refer to Section 6
7.1.4 Fit replacement parts when available.
7.1.5 Remove battery. Refer to 6.11
7.1.6 Drain fuel

7.2 Removal from Storage

7.2.1 Charge battery and refit Refer to 6.11
7.2.4 Carry out machine preparation as necessary Refer to Section 4

When the machine is finally scrapped, the following items should be disposed of only at authorised waste disposal facilities.

Engine oil. Hydraulic oil. Antifreeze. Battery. Tracks.

If in doubt, consult the Local Authority environmental department.

Major non-ferrous items such as hydraulic hoses may also be disposed of separately.

Operating & Faulting Finding Parker's Hydraulic System and IQAN Control System

Operating The Machine

Two Operating Conditions

Mulching Mode – Normal default working mode for travelling with the machine and using it with a mulching head or flail mower.

Chipping Mode – Engaged when selecting – latch spare functions.
In this mode the Main Hydrostatic Drive and Spare Up function are the only functions available.
Hydrostatic Drive for the chipper drive and the spare for the chipper feed function
The driver does not have to be seated in the cab to operate these functions in this mode.

Operating Safety – Default Mulching Mode

Switch in Seat
System is not functional if the operator is out of the seat, if the operator gets out of the seat all the machine functions will stop.

Start Up
After start up all functions must be in their – de-activated position before the system becomes available.

Joystick Lever – Mode Select
The Joystick must be in the central position and no buttons activated on the lever before you can change the Joystick working mode.
If the Float Function is latched it will remain latched when selecting between modes.

On/OFF Functions – Hold to Activate

Digital Outputs on Expansion Units – XP2-A0, XP2-A1 & XT2-A0 - Crowd, Rotate, Frame, Guard, Right Leg, Left Leg & Spare

What Controls these Functions? – Operator Using - IQAN-LL Lever Axis, Buttons in Handle or Switches mounted in the operator's panel.

What Stops the Functions Operating? – Operator not in Seat, Wrong Mode Selected on the Lever

Proportional Functions

Current Output on Expansion Units – XT2-A0 - Lift/Lower Head

What Controls the Functions? – Operator Using - IQAN-LL Lever Axis
Operator Selecting Float Function

What Stops the Functions Operating? – Operator not in Seat.
Another Function Selected at Start Up.
Wrong Mode Selected on the Lever – For Lift/Lower Function Only
Machine in Chipping Mode – Lift/Lower
Operator releases the Lever.

Current Outputs on Expansion Units - XT2-A0 - Mulching Head Forward & Reverse

What Controls the Functions? – Latch Type Switches mounted on the Operators panel.

What Stops the Functions Operating? – Operator not in Seat – Mulching Mode Only
Switch to activate the mulching in the opposite is latched – Both switches must be in the de-activated position before selecting the mulching function.

Note: – Mulching Head is an On/Off Function but requires a current output with 3 sec ramp time from zero to full speed and the same for full to zero speed.
In Chipping Mode – The Mulching Head will operate without the need for the operator to be in the seat.

Current Outputs on Expansion Units – XP2-A0 Left & Right Tracks

What Controls the Functions?	Operator Using - IQAN-LSL Levers
What Latches these Functions?	Switch on Operators Panel
What Stops the Functions Operating?	Operator not in Seat! A Function Selected during Start Up Machine in Chipping Mode – Lift/Lower of Head & Tracks Only Operator releases lever – Unlatched Condition Only If the operator selects any or both levers in the opposite direction or activate the latching switch again. – Latched Condition Only
What Controls Track Speed? -	Operator via IQAN-LSL Levers Engine Speed Drops Below 1600 RPM – Reduces current to both tracks - Tracks slow down Mulching Pressure > 330 Bar – Reduces current to both tracks - Tracks Slow Down Second Speed Select – Selects a different motor displacement – High Torque Low Speed or the opposite Trim Potentiometer - mounted in operators panel trims steering of vehicle, reduces current to one track - one track only slows down.

<u>Other Current Output Functions</u>

Current Outputs Configured as Digital Outputs – XP2-A0 & XP2-A1 - Float Select Solenoid, Float Rotate Solenoid

Proportional Current Output – Float Control Solenoid

What Controls the Functions? –	Operator via - IQAN-LL Latched Button – Push On/Push Off Float Rotate Solenoid - Operates Automatically 0.5secs. after Float Functions reaches its required Float Pressure Level Mulching Pressure> 340Bar – Float Pressure will increase to lift Mulching Head
What Stops the Functions Operating? –	Operator not in the Seat! Wrong Mode Selected on the Lever Machine in Chipping Mode – Lift/Lower of Head & Tracks Only Engine Speed below 1200 RPM Operator Presses Button to De-activate Float Function

Current Outputs Configured as Digital Outputs – XP2-A1 Two Speed Select – Selects 2nd Displacement on the Track Motors

What Controls the Functions? –	Operator via – Switch in Panel Tracks have to be at < 20% of their set current for 1 sec – Tracks on automatically ramp down over .5 sec to <20% and then increase to selected speed over 0.5sec
What Stops the Functions Operating? –	Operator not in Seat! Machine in Chipping Mode

Current Outputs Configured as Digital Outputs – XP2-A1 Fan Dump Solenoid – When Energized the Hyd Oil Cooler Fan is at a very low speed.

What Controls the Functions? –	Automatically Controlled by IQAN from Temperature Sensor in Hydraulic Reservoir – Oil Temp > 50^{O}C Solenoid De-energised Cooling Fan Running At Max Speed Oil Temp < 40^{O}C Solenoid Energised Fan Running at Minimum Speed
What Stops the Functions Operating? –	Ignition Off

Current Outputs Configured as Digital Outputs – XP2-A0 Pump Load Solenoid – De-energise Solenoid to bring the Variable Displacement Implement Pump on Load when any of the On/Off Cetop. Directional Valves are Selected.

What Controls the Functions? –	Automatically Controlled by IQAN any time the one of the On/Off Functions are selected by the operator**.**

Initial Start Up of Machine or After Major Machine Overall

Before initial start up of the engine, fit a pressure gauge to the pump outlet and in the Load Sense Pressure hose to the pump.

Note! The engine should not be started without first checking the following:-

1. All the pipes and hoses are connected correctly and the fitting are fully tightened.

2. All the electric connections are fitted and tightened.

3. Hydraulic Reservoir is filled to the recommended level and the pumps are primed. (See Pump Initial Start Procedure)

4. The pre- Engine Start Up procedure has been completed (See Engine Instructions).

5. The Correct Application File is present in the IQAM-MDM Unit.

6. There are no IQAN. Communication or other faults reported – All the IQAN expansion modules should have a constant green and flashing orange light.

Note! The majority of the IQAN – inputs and outputs can be checked using a laptop computer without running the engine. (See the IQAN Check Procedure). To correct faults use the Fault Finding Procedure.

Checks After Starting Engine.

Main Implement Pump should be at Standby Pressure
Fan Drive on the Engine Cooling Radiator should be running.
The Mulching Head should not be turning.

Before running any functions:-

Check the Main Implement Pump Standby Pressure - Pressure at Pump Outlet should not be 25 + 2.5/- 0 bar.

Check the charge pressure at the Mulching Head Pump is to the correct level

Note! For details on how to set up the pumps see the manufactures instructions. Use the fault finding procedures to correct any faults.

Use the Trouble Shooting Procedure to correct any faults.

Setting Up the System

Checking the Pump Pressures

The pump pressure setting should be set in accordance with the suppliers recommendations.

Checking the Valve Pressures

The three – Spool Proportional Directional Control Valve (L90LS) is supplied with the maximum pressure levels set at the factory and should not be adjusted unless absolutely necessary.

To Check the Relief Valve Setting – The pump cut out pressure setting has to be set to approximately 20 bar above the desired setting on the valve. The relief valve on the valve should then be set to the correct pressure level (see circuit drawing) After the Relief Valve on the main valve is set the pump cut pressure should be reset so that it is 20 bar below the valve setting. These setting should be down by stalling out one of the lower flow on/off functions.

The Relief Valves on the A & B ports of the Track spools cannot be adjusted these are pre-set and welded at the supplier's factory.

Check the Functionality

Safety Functions

All functions should stop when the operator leaves the seat. If the operator then returns to his seat it should not be possible to re-activate a function by the action of the operator sitting down again. All switches/levers have to be returned to their off position before any function can be re-activated.

On/Off Functions on Multi–Valve Manifold – Settings the Speed

Mulching Head – Function & Speed

Track Function & Speed

Boom Lift & Lower Function

Float Function

Float Rotate Function

Mulching Head - Anti-Stall Function

Fan Drive Speeds & Function

IQAN – Check Procedure

Connect a laptop to the IQAN-MDM Unit using the RS232 Cable – Parker Part No. 5030024.

Note! If the laptop does not have an RS232 Serial Connector a suitable USB to Serial Adaptor will be required

Boot up the computer and open the IQAN –Change Software before switching the Ignition On

Switch on the ignition, **but do not start the engine**, Check that the Computer Com Port is now on line (Bottom right hand corner of the IQAN-Change Window) – If no communication is established check that the correct COM port is selected. (Should be the same as for the Serial Port or USB adaptor) If not change this by going to the file drop down box and selecting properties and the communication tab then select the correct Com Port.

Upload the Application File from the IQAN-MDM Unit by pressing the Get Application from IQAN system Icon on the Menu Bar – Application should download and the five CANBUS IQAN modules should be seen in the System Overview Tab. Check the application file is correct and is the latest issue.

If there is no Application File in the IQAN – MDM Unit, open the latest file in the IQAN-Change Software and download this to the IQAN-MDM using the Send application to the IQAN-System Icon on the Toolbar.

Note! For more detail about these procedures see the IQAN-develop Manual.

Having established communication between the laptop and the IQAN System the IQAN-Change Software can be used to check all of the inputs from the levers, switches and sensors without the engine running only the ignition on

For details about how to do this see Measuring & Fault Finding Page 311 of the IQAN-Develop manual.

Input Specifications

Voltage Inputs	Channel	Max.	Min.
Trim Float Switch (IQAN-LL)	A		
Seat Switch (IQAN-LL)	B		
Track Right Primary (IQAN-XP2-A0)	A		
Track Right Secondary (IQAN-XP2-A0)	B		
Track Left Primary (IQAN-XP2-A0)	C		
Track Left Secondary (IQAN-XP2-A0)	D		
Mulch Pressure (IQAN-XP2-A1)	A		
Fuel Filter (IQAN-XP2-A1)	B		
2nd Speed Select (IQAN-XP2-A1)	C		
Air Filter (IQAN-XP2-A1)	D		
Hyd. Oil Filter (IQAN-XT2-A0)	B		
Hyd. Oil Temperature (IQAN-XT2-A0)	C		
Main Filter Indicator (IQAN-XT2-A0)	D		
Transmission Filter Indicator (IQAN-XT2-A0)	E		
Track Trim Potentiometer (IQAN-XT2-A0)	F		
Fuel Sensor (IQAN-XT2-A0)	G		
Track Latch Inputs (IQAN-XT2-A0)	H		

Input Specifications

Digital Inputs	Channel	Max.	Min.
Left Leg In (IQAN-LL)	A		
Left Leg Out (IQAN-LL)	B		
Right Leg In (IQAN-LL)	C		
Right Leg Out (IQAN-LL)	D		
Mulching Head FWD. (IQAN-LL)	E		
Mulching Head REV. (IQAN-LL)	F		
Guard/Spare Up (IQAN-LL)	G		
Float Latch Switch(IQAN-LL)	H		
Guard/Spare Down (IQAN-LL)	I		
Mode Switch (IQAN-LL)	J		

Directional Analogue	Channel	Max.	Min.
Crowd & Rotate (IQAN-LL)	X		
Lift & Frame (IQAN-LL)	Y		

Output Specifications

Current Outputs		Channel	Max.	Min.
Left Track Valve (IQAN-XP2-A0)	(Operator must be in the Seat)	A1		
Right Track Valve (IQAN-XP2-A0)	(Operator must be in the Seat)	B1		
Pump Load Solenoid (IQAN-XP2-A0) Configured as Digital Output	(Activated on Start Up)	C1		
Float Select Solenoid (IQAN-XP2-A0) Configured as Digital Output	Activated during Boom Lift & Float Activation (Operator must be in the Seat)	D1		
Second Speed Solenoid (IQAN-XP2-A1) Configured as Digital Output	(Operator must be in the Seat)	A1		
Float Rotate Solenoid (IQAN-XP2-A1) Configured as Digital Output	(Operator must be in the Seat)	B1		
Float Control Solenoid (IQAN-XP2-A1) Configured as Digital Output	(Operator must be in the Seat)	C1		
Fan Dump Solenoid (IQAN-XP2-A1) Configured as Digital Output	Activated at Temp	D1		
Mulching Head Solenoid (IQAN-XT2-A0)	(Operator must be in the Seat)	A1		
Lift Up/Down Solenoid (IQAN-XT2-A0)	(Operator must be in the Seat)	B1		

Digital Outputs		Channel	Max.	Min.
Frame Up Solenoid (IQAN-XP2-A0)	(Operator must be in the Seat)	A1	12 Volt	0 Volt
Frame Down Solenoid (IQAN-XP2-A0)	(Operator must be in the Seat)	B1		
Guard Up Solenoid (IQAN-XP2-A0)	(Operator must be in the Seat)	C1		
Guard Down Solenoid (IQAN-XP2-A0)	(Operator must be in the Seat)	D1		
Crowd Fwd Solenoid (IQAN-XP2-A1)	(Operator must be in the Seat)	A1		
Crowd Back Solenoid (IQAN-XP2-A1)	(Operator must be in the Seat)	B1		
Head Rotate Left (IQAN-XP2-A1)	(Operator must be in the Seat)	C1		
Head Rotate Right (IQAN-XP2-A1)	(Operator must be in the Seat)	D1		
Left Leg In Solenoid (IQAN-XT2-A0)	(Operator must be in the Seat)	A1		
Left Leg Out Solenoid (IQAN-XT2-A0)	(Operator must be in the Seat)	B1		
Right Leg In (IQAN-XT2-A0)	(Operator must be in the Seat)	C1		
Right Leg Out (IQAN-XT2-A0)	(Operator must be in the Seat)	D1		
Spare Up Solenoid (IQAN-XT2-A0)		E1		
Spare Down Solenoid (IQAN-XT2-A0)		F1		

Fault Finding

Introduction

All the functions on the machine except for the fan drive & mulching head are fed from the single open circuit variable displacement load sense pump mounted on the back of the closed circuit pump.

This faultfinding procedure only covers:-
The Open Circuit Hydraulic System shown on Circuit Drawing on Page
The electrical system (IQAN) on Page , for controlling the Open Circuit Hydraulic System and the Closed Circuit Hydraulics on the Mulching Head.
Note:- The mulching head is the only function fed from the closed circuit pump & motor, to fault find the hydraulic part of this system see the manufactures service manual.

All the functions on the machine except for the 2 track motors and the Lift functions and the spare function are controlled from the bank of 6 on/off directional control valves (See circuit drawing Items 5 to 8).
Max flow to these functions – 10 LPM, set by flow regulator (Item 15 on circuit).
Max pressure 230bar – Set by pressure cut off valve on the pump.

The Spare Function is fed via a separate on/off directional control valve (Item 18 on the circuit)

The two track spools are controlled by the first two spools on the 3-Spool L90LS valve and the lift and float functions by the spool no.3 and the integrated manifold on the L90LS proportional valve (Item 1on the circuit).

Mulching Mode:- When in this mode none of the functions, except for the fan drive, will work if the operator is not on the cab seat.

Chipping Mode:- In this mode none of the functions will work except for the Spare Function and the Mulching Function without the operator being in the cab seat.

When diagnosing faults it is important to consider the operator mode of the machine, electrics and hydraulics in this order as this is the easiest and quickest way.

Electrics

The majority of the electric fault finding can be done with the engine off and ignition on.

Before connecting the laptop it is important to establish that the MDM and Expansion units are properly powered up and there are no flashing red lights. (See possible faults ** to **).

To do any fault finding under the cab the cab seat switch will require bypassing. **FOR SAFETY REASONS IT IS VERY IMPORTANT THAT ANY BYPASS IS REMOVED AFTER THE FAULTS HAVE BEEN DIAGNOSED.**

This fault finding analysis assumes the service engineer has a laptop, the necessary leads to communicate with the IQAN-MDM Controller in the Cab and a copy of the IQAN-Change software.

Once the laptop communication with the MDM is established the Application file can be downloaded to the computer by clicking on the Get Application Button

Software:

It is not possible to troubleshoot the original software in the field problems with the operating systems in the IQAN-MDM should be solved by updating the VMAC file.
The application file in the MDM unit is the property of the original equipment manufacturer and this can only be modified by him or with his permission.

Hydraulics

Electrics

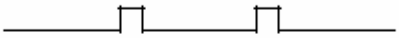
System Diagnostics

IQAN-MDM Control Unit (Location – Cab)

There is one LED on the rear of this unit, the LED indicates a supply voltage with a steady green light.
If this LED is out, the supply voltage is missing
Diagnostic messages for the IQAN–MDM or for the system in which it is the master unit are shown on the front LCD panel.

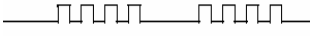
IQAN-XT2 Expansion Unit (Rear Frame under Cab)

Some of the Fault finding on the Expansion units can be done by looking at the Status of the LED indictor lights on the front of each unit.

Status		Blink (yellow light)
Normal (no errors)		
Error code	**Error**	**Blink (red light)**
1	I/O and voltage errors	
2	High temperature	
3	CAN error	
4	Hardware error	
5	Address error	
6	Software error	

For assistance with using the indicator lights see Parker IQAN – MDM, XT2 & XP2 instruction manuals, these can be downloaded from www. Iqan.com/documents/

Note – Internal diagnostics of all the units can be done using the IQAN-Change software on the laptop,

Symptom	Fault	Possible Cause	Remedy
None of the IQAN modules will come on.	No power supply at any of the modules.	Isolator switch is Off. Poor power supply connection to the Fuse box. Poor ground connection. Battery not properly connected	Check switch and connections at the switch Check there is a 12 Volt power supply at the fuse box. Check the connections at the battery and the earth connections for each IQAN-module
MDM does not power up but expansion units have powered up but red lights are flashing on the Expansion Units.	LED light on the rear of the IQAN-MDM Unit is out. No battery Power at Pin 6 on the MDM, 3A Fuse keeps blowing	3A Fuse has blown Faulty wiring harness Faulty wiring harness – direct short in wiring harness. Direct Short in MDM	Change the fuse. Change the harness Remove Connector from MDM check there is no direct short between Pins 6 & 3 on the Harness and MDM connector using a meter If no volts check the 3A fuse with a meter. Change MDM & download application if not already installed
Electronic System is not working correctly	Check the I/O Expansion Units XP2 & XT2 check LED lights for possible error.	Low Voltage at the modules. Too high a temperature CAN error Hardware Error 	Check supply voltage at each IQAN- Module Connector using a meter. If All Low - Check harness, Change vehicle battery If one module only reporting low voltage – change this module. Change the unit displaying this error.

Symptom	Fault	Possible Cause	Remedy
Electronic System is not working correctly - Continued	**Check the I/O Expansion Units XP2 & XT2 check LED lights for possible error.**	**CAN Address error** **Software Error** 	**Check the ID Tag on the Can address pins are in the correct position see wiring circuit. And in the correct module, use the laptop to check the address of each module** **Use laptop to send new VMAC File – then send new application file.** **If error still present change the IQAN-MDM Unit.**
Pump stays at maximum pressure with all the function de-energised.	**LS single at the Pump is not unloading, Check Pressure at LS Port**	**No current at Solenoid Valve (Item 3).** **Faulty Solenoid Valve (Item3) sticking in Closed position.** **Blocked Orifice in the spools of the L90 Valve (Item 1) or one of its spools has failed to return fully to the neutral position.**	**Check the programme is sending a current to Solenoid Valve (item3) using the IQAN-Change Programme – with no function activated there should be a current on XP2–AO Channel C1 Pin 23** **Change the Solenoid Valve (Item3)** **To check for this fault connect the hose & the LSP Port on the L90 Valve (Item1) to tank. If the Pump is still not unloading to standby pressure the fault is in the L90 valve – Change the valve.**
Pump stays at maximum pressure with all the function de-energised and there is no pressure at the LS port on the Pump	**Pump is failing to de-stroke**	**Faulty Pump Controller or Pump.** **Use Pump manufactures service instruction to diagnose the fault.**	**Change or clean pump controller or change the complete Pump.**
System is getting very hot at average ambient temperatures. **No Warning on the LED Screen IQAN-MDM at temperatures > 90^{O}C**	**Temperature Sensor not sending the correct single to the IQAN system**	**Faulty Temperature Sensor.**	**Change the temperature sensor.**

Symptom	Fault	Possible Cause	Remedy
System is getting very hot at average ambient temperatures.	**Fan Drive on hydraulic cooler has failed to come on.**	**Voltage on Solenoid valve (Item 3) at temperatures> 50^{O}C** **Solenoid Valve (Item3) is sticking in the open position.** **Faulty Temperature Sensor.**	**Remove Connector on the Solenoid valve (Item23) – check to see if the fan runs, if it does go to 1 and if it doesn't go to 2.** **1. Check there is no Voltage at the Harness Connector on Solenoid Valve (Item3). If there is use the Laptop and IQAN-Change to diagnose the fault – could be a faulty temperature transducer.** **2. Change Solenoid Valve (Item3)**
Warning on the LED Screen IQAN-MDM – Hydraulic Oil Temperature > 90^{O}C 	**Both Fan Motors Running too Slow.**	**Relief valve in Fan pump set too low. (Item16).** **Internal leakage on Pump too high (Item 16) Internal leakage in Fan motors too high (Items 17). on the Engine or Hydraulic Cooler,**	**Check the Relief valve pressure setting.** **Recommend the Change the Pump first and then both Motors are together, if any of these units are starting to fail it could affect the others. Check for contamination in return line Filter?**
	At the maximum pressure the pump is not backing off	**Pressure Cut Off on the pump set higher than the Relief Valve in the L90LS Valve (Item1).**	**Reduce the pressure cut off setting at the pump if this is the fault a reduction in the noise level will noticed as the demand on the engine reduces. – Reset the valve relief valve and the pump cut off pressure.**
	Faulty Open Circuit Pump or Closed Circuit Pump.	**One of the pumps could be starting to fail – greatly reducing the Volumetric and mechanical efficiency**	**Change the pumps**
	Faulty Mulching Motor	**Motor starting to fail significant reduction in the volumetric or mechanical efficiency**	**Change the Mulching head motor**

Symptom	Fault	Possible Cause	Remedy
Warning on the LED Screen IQAN-MDM – Hydraulic Oil Temperature > 90^{O}C - Continued	**Faulty Track Motors.**	**One of the track motors starting to fail – tracks would be slower and not track straight.**	**Change the faulty track motor.**
	Track Motor Brakes have not released properly.	**Sticking Brake Actuator mechanism, damaged brake discs**	**Change the track motor**
	Damaged or trapped hoses.	**Sticking brake actuator**	
Fan Drive on the hydraulic cooler continues running at hydraulic oil temperatures < 40^{O}C	**Solenoid Valve (Item 23) is not opening.**	**Sticking Solenoid Valve.**	**Replace Valve (Item23).**
	No voltage at Solenoid Valve (Item 23)	**No voltage signal from IQAN Controller.**	**Check there is 12 Volts at the Solenoid Connector using a meter.**
		Faulty temperature transducer.	**Change the Temperature Transducer**
None of the function will work with the machine in the Mulching Mode	**Operator on Seat - Signal not received from at the IQAN System – No voltage signal on the IQAN-LL Lever-Channel B Pin C2**	**Faulty Seat Switch**	**Change Seat Switch**
		Fault in wiring harness/connectors	**Check connection or change harness.**
All of the on/off functions will not work e.g. Left or Right Leg, Rotation, Guard/Spare, Crowd or Frame Tilt/Spare	**Pump is not coming on load.**	**Voltage on the Solenoid Valve (Item3) is not de-energising.**	**If removing the connector on the Solenoid Valve (Item 3) bring the pump on load fault is in the IQAN control System.**
		Solenoid Valve (Item 3) is sticking in the open position.	**Change the solenoid valve (Item 3)**
		Leakage from the load sense line in the L90 Proportional Valve (Item 1).	

Symptom	Fault	Possible Cause	Remedy
One of the on/off functions will not work. **e.g. Left or Right Leg, Rotation, Guard/Spare, Crowd or Frame Tilt/Spare.**	**Solenoid Operating the function is not selecting**	**No Voltage at the Solenoid valve.** **Sticking Solenoid valve**	**Check there is a voltage on the connector to the solenoid valve. If not present diagnose the problem using the laptop & IQAN-Change Software** **Replace Solenoid Valve.**
Left or Right Track Leg do not stay up.			

Symptom	Fault	Possible Cause	Remedy
Rotate Function will not hold its selected position when the float function is de-activated.			
Rotate Function does not go into the float mode when the Mulching Head Float Function is selected.			
Rotate Stays in Float when the Float Function is disengaged or the Lift Function is operated.			
Track Motors will not turn.			
One track travels much faster than the other in both directions.			
One track travels much faster than the other in one direction only.			
Cannot select two second speed on the tracks.			
Both tracks will only travel very slowly.			

Symptom	Fault	Possible Cause	Remedy